

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
SCHOOL OF MECHANICAL ENGINEERING
B. Tech. (Mechanical Engineering) Minor Examination (Even Semester) 2018-19

Entry No:

Date: 07th Feb. 2019

Course Code: MEL 2212

Total Number of Pages: [01]

Total Number of Questions: [04]

Course Title: Thermal Engineering

Time Allowed: 1 ½ Hours

Max Marks: [50]

Instructions / NOTE

- i. Attempt All Questions.
- ii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
- iii. Assume an appropriate data / information, wherever necessary / missing.
- iv. Use of Steam Table is permissible in examination.

Section - A			
Q1.	(i) Define the term (a) Boiler efficiency (b) Evaporation ratio (ii) Differentiate between water tube and fire tube boiler. List out various types of water tube boiler	04 2 06 3	CO1
Q2.	List out the various boiler mountings and accessories with neat sketch	10 3	CO1
Q3.	(i) Define the term 'Steam Nozzle'. List out various types of steam nozzle with neat sketch. (ii) Derive an expression to estimate the discharge through steam nozzle in terms of pressure at inlet and outlet.	5 2 5 2	CO1
Section - B			
Q4.	The following are the data collected for a boiler using furnace oil as the fuel. Find out the boiler efficiency by indirect method. Ultimate analysis (%) Carbon=84; Hydrogen=12; Nitrogen=0.5; Oxygen= 1.5; Sulphur = 1.5; Moisture = 0.5; GCV of fuel = 10000 kCal/kg; Fuel firing rate = 2648.125 kg/hr; Surface Temperature of boiler = 80°C; Surface area of boiler = 90m ² ; Humidity = 0.025 kg/kg of dry air; Wind speed = 3.8 m/s Flue gas analysis (%) Flue gas temperature = 190°C; Ambient temperature = 30°C; CO ₂ % in flue gas by volume = 10.8 ; O ₂ % in flue gas by volume = 7.4	20 8	CO2

Course Outcomes

CO1. To understand the basic concept of various thermal engineering components.

CO2. To investigate the effectiveness of energy conversion process in mechanical power generation and steam power plants and its components.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1,2,3	30	35
CO2	4	20	35